

**SECTION 08 80 00
GLAZING**

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This section specifies glass, related glazing materials and accessories. Glazing products specified apply to factory or field glazed items.

1.02 RELATED WORK

- A. Section 08 11 13, HOLLOW METAL FRAMES.
- B. Section 08 14 00, INTERIOR WOOD DOORS.
- C. Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.
- D. Division 26, ELECTRICAL.

1.03 LABELS

- A. Temporary labels:
 - 1. Provide temporary label on each light of glass identifying manufacturer or brand and glass type, quality and nominal thickness.
 - 2. Label in accordance with NFRC (National Fenestration Rating Council) label requirements.
 - 3. Temporary labels shall remain intact until glass is approved by Contracting Officer's Representative (COR).
- B. Permanent labels:
 - 1. Locate in corner for each pane.
 - 2. Label in accordance with ANSI Z97.1 and SGCC (Safety Glass Certification Council) label requirements.
 - a. Tempered glass.
 - b. Laminated glass or have certificate for panes without permanent label.
 - c. Switchable privacy laminated glass.

1.04 PERFORMANCE REQUIREMENTS

- A. Glass Thickness:
 - 1. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 - 2. Test in accordance with ASTM E 1300.
 - 3. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.
- B. Switchable Privacy Laminated Glass: Switchable privacy laminated glass assembly shall be listed by UL in Building Materials Directory or other approved testing laboratory bearing permanent mark of approval.

1.05 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Certificates:
 - 1. Certificates stating that tempered, meets requirements for safety glazing material as specified in ANSI Z97.1.
- C. Warranty: Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.
- D. Manufacturer's Literature and Data:
 - 1. Glass, each kind required.
 - 2. Glazing cushion.
 - 3. Sealing compound.
 - 4. Manufacturer's installation manual for switchable privacy laminated glass assembly.
- E. Shop Drawings: (1/2 full scale) showing construction, anchorage, reinforcement, and installation details. Submit wiring diagram and instructions for switching privacy tempered glass assembly.
- F. Samples:
 - 1. Size: 150 mm by 150 mm (6 inches by 6 inches).
 - 2. Switchable privacy laminated tempered glass with etched pattern.
 - 3. Laminated tempered glass with etched pattern.
- G. Operation and Maintenance Data: Operation and maintenance data for switchable privacy glass system. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to performance.
- H. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.
- B. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep storage area clean and dry.
- C. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Field measure openings before ordering tempered glass products. Be responsible for proper fit of field measured products.

1.08 WARRANTY

- A. Warranty: Conform to terms of "Warranty of Construction", FAR clause 52.246-21, except extend warranty period for the following:
 - 1. Laminated Glass: Laminated glass units to remain laminated for 5 years.
 - 2. Switchable Privacy Glass: Provide a 5-year warranty against electrical failure and/or delamination in material and workmanship of the switchable privacy glass panel.

1.09 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
 - Z97.1-09 Safety Glazing Material Used in Building - Safety Performance Specifications and Methods of Test.
- C. American Society for Testing and Materials (ASTM):
 - C794-10 Adhesion-in-Peel of Elastomeric Joint Sealants.
 - C864-05 Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 - C920-11 Elastomeric Joint Sealants.
 - C1036-06 Flat Glass.
 - C1048-12 Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
 - C1363-05 Thermal Performance of Building Assemblies, by Means of A Hot Box Apparatus.
 - C1376-10 Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
 - D635-10 Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastic in a Horizontal Position.
 - E84-10 Surface Burning Characteristics of Building Materials.
 - E119-10 Standard Test Methods for Fire Test of Building Construction and Material.
- D. Code of Federal Regulations (CFR):
 - 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; 2010.
- E. National Fenestration Rating Council (NFRC)
- F. Safety Glazing Certification Council (SGCC) 2012:
 - Certified Products Directory (Issued Semi-Annually).
- G. Glass Association of North America (GANA):
 - Glazing Manual (Latest Edition)
 - Sealant Manual (Latest Edition)

PART 2 – PRODUCT

2.01 GLASS

- A. Use thickness stated unless specified otherwise in assemblies.
- B. Clear Glass:
 - 1. ASTM C1036, Type I, Class 1, Quality q3.

2. Thickness, 6 mm (1/4 inch) and as shown.
3. Coordinate color/tint/coating to accommodate required security monitoring.

2.02 HEAT-TREATED GLASS

- A. Clear Heat Strengthened Glass:
 1. ASTM C1048, Kind HS, Condition A, Type I, Class 1, Quality q3.
 2. Thickness, 6 mm (1/4 inch).
- B. Clear Tempered Glass:
 1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
 2. Thickness, 6 mm (1/4 inch) and as indicated shown.
- C. Tempered Patterned Glass:
 1. ASTM C1048, Kind FT, Type II, Class 1, Quality q3 with textured pattern etched on glass surface.
 2. Textured Pattern: Linear Freehand, GlasPro-FX by GlasPro Inc.
 3. Thickness, 6 mm (1/4 inch) and as indicated shown.

2.03 LAMINATED GLASS

- A. Two or more lites of glass bonded with an interlayer material for use in building glazing.
- B. Clear Color Interlayer:
 1. Use 1.5 mm (0.060 inch) thick interlayer, unless otherwise specified.
 2. Heat strengthened or fully tempered glass assemblies.

2.04 GLAZING ACCESSORIES

- A. As required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Ferrous metal accessories exposed in the finished work shall have a finish that will not corrode or stain while in service.
- B. Setting Blocks: ASTM C864:
 1. Channel shape; having 6 mm (1/4 inch) internal depth.
 2. Shore a hardness of 80 to 90 Durometer.
 3. Block lengths: 50 mm (two inches) except 100 to 150 mm (four to six inches) for insulating glass.
 4. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
 5. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.
- C. Spacers: ASTM C864:
 1. Channel shape having a 6 mm (1/4 inch) internal depth.
 2. Flanges not less 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
 3. Lengths: One to 25 to 76 mm (one to three inches).
 4. Shore a hardness of 40 to 50 Durometer.
- D. Glazing Sealants: ASTM C920, silicone neutral cure:
 1. Type S.
 2. Class 25
 3. Grade NS.
 4. Shore A hardness of 25 to 30 Durometer.

- E. Structural Sealant: ASTM C920, silicone acetoxycure:
 - 1. Type S.
 - 2. Class 25.
 - 3. Grade NS.
 - 4. Shore a hardness of 25 to 30 Durometer.
- F. Color:
 - 1. Color of glazing compounds, gaskets, and sealants used for aluminum color frames shall match color of the finished aluminum and be nonstaining.
 - 2. Color of other glazing compounds, gaskets, and sealants which will be exposed in the finished work and unpainted shall be clear color.

2.05 SPECIAL REQUIREMENT FOR SWITCHABLE PRIVACY GLASS

- A. Electric Connections:
 - 1. Locate steel channel cap on one panel edges, integrally connected to glass panel polymer dispersed liquid crystal film (PDLC) core.
 - 2. Integrally connect flexible steel conduit, not less than 1800 mm (six feet long), to steel channel cap. Provide threaded end fitting at free end.
 - 3. Integrally connect type TFFN or THHN number 18 AWG minimum size to panel with not less than 150 mm (six inches) extending beyond flexible conduit end.
- B. Power Conditioner:
 - 1. Designed to provide square wave electrical power to discharge the LC film, suppress voltage surges and transients, reduces inrush current, and reliably discharge the LC film.
 - 2. Operate from 120 volt AC, 60 Hz input.
 - 3. Operation:
 - a. With voltage PDLC core becomes transparent.
 - b. Without voltage PDLC core becomes translucent.
- C. Swing Doors: Provide power transfer device at door frame.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 - 1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.
 - 2. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer's approved shop drawings.
- B. Advise Contractor of conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation: Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Inspect each piece of glass immediately prior to start of installation. Do not install items which are improperly sized, have damaged edges, or are scratched, abraded, or deficient in any other manner.

3.02 PREPARATION

- A. For sealant glazing, prepare glazing surfaces in accordance with GANA-02 Sealant Manual.

- B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.
- C. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.
- D. Verify that components used are compatible.
- E. Clean and dry glazing surfaces.
- F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

3.03 INSTALLATION – GENERAL

- A. Install in accordance with GANA-01 Glazing Manual and GANA-02 Sealant Manual unless specified otherwise.
- B. Install switchable privacy tempered glass assembly in accordance with manufacturer's written instructions and approved shop drawings..
- C. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test Requirements specified in other applicable sections of specifications.
- D. Set glazing without bending, twisting, or forcing of units.
- E. Do not allow glass to rest on or contact any framing member.
- F. Glaze doors in a securely fixed or closed and locked position, until sealant has thoroughly set.
- G. Patterned Glass: Install units in interior partitions with pattern in same direction in all openings.
- H. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
- I. Laminated Glass:
 - 1. Tape edges to seal interlayer and protect from glazing sealants.
 - 2. Do not use putty or glazing compounds.

3.04 INSTALLATION – WET METHOD (SEALANT AND SEALANT)

- A. Place setting blocks at 1/4 points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- C. Fill gaps between glazing and stops with glazing sealant to depth of bite on glazing, but not more than 9 mm (3/8 inch) below sight line to ensure full contact with glazing.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.05 INSTALLATION - BUTT GLAZED METHOD (SEALANT ONLY)

- A. Temporarily brace glass in position for duration of glazing process. Mask edges of glass at adjoining glass edges and between glass edges and framing members.
- B. Temporarily secure a small diameter non-adhering foamed rod on back side of joint.
- C. Apply sealant to open side of joint in continuous operation; thoroughly fill the joint without displacing the foam rod. Tool the sealant surface smooth to concave profile.
- D. Permit sealant to cure then remove foam backer rod. Apply sealant to opposite side, tool smooth to concave profile.
- E. Remove masking tape.

3.02 REPLACEMENT AND CLEANING

- A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by COR.
- B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.
- C. Leave glass, putty, and other setting material in clean, whole, and acceptable condition.

3.03 PROTECTION

- A. Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.

3.04 GLAZING SCHEDULE

- A. Refer to Drawings for glazing location.
- B. Glass Type GL-1, Clear laminated glazing assembly:
 - 1. Both panes 1/4-inch thick clear glass; laminated with a clear color interlayer of 0.060-inch thick polyvinyl butyryl (PVB).
 - 2. Nominal Thickness: 9/16 inch.
- C. Glass Type GL-2, Switchable privacy laminated tempered glazing assembly:
 - 1. One (1) pane 1/4-inch thick clear tempered glass; one (1) pane 1/4-inch thick patterned tempered glass with etched pattern on inner surface of laminated glass; one (1) layer of polymer dispersed liquid crystal film (PDLC) between two (2) clear color interlayers of 0.030-inch thick polyvinyl butyryl (PVB); Switchable Privacy Glass by GlasPro Inc.
 - 2. Nominal Thickness: 9/16 inch.
- D. Glass Type GL-3, Laminated tempered glazing assembly:
 - 1. One (1) pane 1/2-inch thick tempered patterned glass with etched pattern on both sides.
 - 2. Glass by Skyline Design – Light + Shadow, Cascade, Technique Option L
 - 3. Nominal Thickness: 1/2 inch.

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